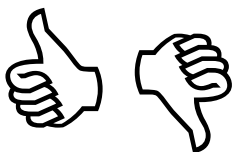


AP226 Expert Working Groups Workshop No. 6
Held on 3-4 December 1998 at Lloyd's Register House,
Croydon, UK



Minutes of the Meeting

Present:

P Ashton	SpecTec Ltd. (UK)
Z Bazari (Chairman)	Lloyd's Register (UK)
K Brownlie	Consultant (UK)
R Bye	Marintek (Norway)
J Flarup	Odense Steel Shipyard (Denmark)
J Fransman	Kvaerner Masa-Yards (Finland)
S Gau	Rostock University (Germany)
B Inozu	University of New Orleans (USA)
R Krapp	Germanischer Lloyd (Germany)
S I Masdal	Marintek (Norway)
D Radosavljevic	Lloyd's Register (UK)
R Rayner	Lloyd's Register (UK)
S Roering	Germanischer Lloyd (Germany)
G Salvady	Concurrent Technology Corporation (USA)
S Wurst	BIBA (Germany)
T Yaghmai	Bureau Veritas (France)

Apologies:

J Clayton	Stone Manganese Marine (UK)
A Fukushima (Japan)	Japan Marine Standardisation Association
K Gibbons	British Marine Equipment Council (UK)
J Hardenberg	Ministry of Defence (UK)
H Johansson	KaMeWa (Sweden)
A Mechsner	HDW (Germany)
S Ruud	Det Norske Veritas (Norway)
A Taubert	Wartsila NSD (Switzerland)
R Wood	Ingalls Shipbuilding (USA)

1. Welcome and Introduction

The meeting was opened at 11.00 am by Dr Zabi Bazari, welcoming the participants and thanking them for their participation. He passed on apologies on behalf of those who expressed interest in attending (see list above) but could not do so because of other engagements. Participants then briefly introduced themselves and their organisations.

2. Minutes of Previous Workshop

The minutes of Workshop No. 5 were agreed and approved without change.

3. Actions Due to Workshop No. 5

A walkthrough of the action list of Workshop No. 5 was conducted. It was agreed that the majority of the actions have been completed. The following action items were carried forward:

EWG3.21	EWG4.20	EWG4.23	EWG4.24
EWG5.2			

The results of completed actions were discussed.

4. Project Progress Statement

The following statements, on AP226 progress (since Workshop No. 5), were provided by Dr Bazari:

- The new working draft of AP226 Standard (N730) underwent a wide industry review.
- A significant number of comments and issues were received from industry on N730.
- The issues and their resolutions were documented in the form of “AP226 Industry Review Report III”.
- Issues were also discussed on AP226 e-mail group list, at ISO meetings and at support project meetings.
- As a result of discussions and issue resolutions, the following enhancement will be included in the next WD:
 - Enhanced Product Connection model to include further data on connections and connectivity.
 - Enhanced RAM model including failure, fault and maintenance task models.
 - Enhanced Engineering Analysis model (yet to be developed).
 - Enhanced requirements model including equipment utility requirements such as water, fuel, steam, electricity and so on.
 - Models for gas turbine, pump, heat exchanger, electric motor, electric generator, propulsors (all types other than screw propeller)
 - Enhance representation of materials and their properties.
 - Models for propulsion system, mechanical transmission system and piping system.
- AP226 product class library has been enhanced with further development of new classes.
- Germanischer Lloyd (GL) and Concurrent Technology Corporation (CTC) have agreed to actively take part in product class library developments. GL has made liaison with German equipment suppliers in this area.

- Further enhancement of the class library needs to be discussed and decided and AP226 team proposes that we shift this activity to a more formal status within ISO framework.
- Supporting projects are: EDIMAR (EU), MOSys (EU), Agder (Norway), RAM/SHIPNET (USA) and DoD (USA).
- The DoD support centres around the idea of exchange of catalogue data and parts library from supplier to shipyard. DoD support is via CTC participation in AP226 developments.
- The exchange scenario within EDIMAR project, on exchange of equipment specification, is being implemented.
- New exchange scenarios on exchange of RAM data (MOSys, RAM/SHIPNET), maintenance data (MOSys, RAM/SHIPNET), and equipment generic data (Agder) are being defined within the above projects.
- Liaison with ISO TC8 and other APs continued.

5. Review of “Industry Review Report III” and Resolution of Issues

The draft AP226 “Industry Review Report III” was handed over to participants. An outline presentation of the report was provided by Dr Bazari. All the issues received on AP226 Working Draft (N730) have been documented in this report. References made to ISO STEP meetings (Bad Aibling and Beijing), EDIMAR and MOSys projects meetings and AP226 e-mail group list, where discussion on the majority of issues has been conducted. Dr Bazari informed the meeting that the drafted resolution for each issue results either from discussions in the above meetings or is the proposed solution by AP226 that needs to be approved by this meeting.

Dr Bazari proposed that all the issues to be discussed on a one by one basis and the resolution for each to be agreed. The following issues, as documented in Industry Review Report III, were considered and discussed.

- Issues by CTC numbered CTC-AP226-1 to CTC-AP226-59
- Issues by KCS Germany numbered KCSG-AP226-1 to KCSG-AP226-12
- Issues by KCS Sweden numbered KCSS-AP226-1 to KCSS-AP226-6
- Issues by Marintek (MT) numbered MT-AP226-1 to MT-AP226-10
- Issues by DNV numbered DNV-AP226-1 to DNV-AP226-18
- Issues by Keith Brownlie numbered KBC-AP226-1 to KBC-AP226-29
- Issue by Kobelco Marine Engineering numbered KME-AP226-1
- Issue by Hitachi Machinery Works numbered HZCMW-AP226-1
- Issues by Ingalls Shipbuilding numbered IS-AP226-1 to IS-AP226-4
- Issues by Kvaerner Masa-Yards numbered KMY-AP226-1 to KMY-AP226-2

Discussion on issues was carried out over the two days and all the resolutions were agreed. EWG agreed that the resolutions need to be implemented and reflected in the new working draft. The final version of AP226 “Industry Review Report III, inclusive of amendments of this meeting, to be prepared and circulated.

In addition to the specific changes to the proposed resolutions, EWG agreed on the following major items:

- Definitions relating to “failure”, “fault” and “anomaly” need to be agreed as most of the current definitions are not acceptable to the domain experts working in marine environment. For this purpose, a RAM EWG including those organisations interested in the subject will be set up and will agree on the subject.
- The issue of overlapping items between various Ship APs (e. g. pump as in AP217 and AP226) were discussed. It was agreed that harmonisation of the data definitions between various APs is an essential element that must be observed. EWG noted that this harmonisation can be best done at the level of Product Class Library. EWG agreed that provided the definition of attributes is harmonised, the representation of such attributes in various ship APs need not necessarily be exactly the same as the context of various APs vary from each other.
- The terms regarded as “Common Knowledge terms” should not be defined in AP226. These include the names of mechanical systems, equipment, component, parts and so on. The list to be agreed by Expert Working Group.

6. Presentation on Norwegian Efforts in Related Areas

Mr Roar Bye (MT) made a presentation on the NOR(wegian)-RAM initiative that relates closely to the (US) RAM/SHIPNET initiative. NOR-RAM is a research initiative with the following objectives:

“The primary objective of the pilot project is to develop a model for acquisition of data and to contribute to harmonisation of RAM-SHIPNET and AP226”

The NOR-RAM development plan includes:

- Year 1999: NOR-RAM pilot project;
- Years 2000 - 2002: Development, implementation and testing of NOR-RAM including:
 - international co-operation (e.g. ISO STEP AP226, RAM-SHIPNET (US))
 - promotion of NOR-RAM

The presentation highlighted the use of AP226 for this purpose including the long term plan in this field. An electronic version of the presentation is available and will be sent to all the members of EWG upon request.

Dr Bazari informed the meeting that Norwegian Agder project intends to implement an exchange interface, between a pump supplier and a Planned Maintenance System, using AP226. The pump data for this exchange scenario have been identified and AP226 needs to be further developed to satisfy this requirement. This information was provided on behalf of Stain Ruud (DNV) who was planned to make a presentation on the subject but could not attend the meeting.

7. AP226 versus Parts Library

Dr Bazari introduced the ISO 13584 series of standards commonly known as Parts Library. This is a sister standard to STEP (ISO 10303) and aims to facilitate the exchange of “part library data” such as catalogue data. It has been proposed that exchange of mechanical system data between supplier and shipyard can be easily

supported using methodology being developed under Parts Library. This is the subject of investigation by CTC in relation to AP226.

The funding provided for CTC includes provisions for investigating this aspect of AP226 development. LR and CTC had discussed the matter in ISO Beijing meeting and concluded that such an investigation needs to be done as soon as possible.

A programme of work will be conducted in the next few months for this purpose. CTC will mainly carry out this investigation with close liaison with AP226 Team. The final result of this investigation may propose an alternative drafting of AP226 WD N730 to include the facilities provided by Parts Library.

EWG agreed to this investigation and that it has to be done as a priority such that it does not adversely affect the AP226 schedule. CTC will report on the result of this investigation at the next meeting.

8. Presentation on RAM/SHIPNET

Dr Bahadir Inozu (University of New Orleans) presented the objective and the current status of the RAM-SHIPNET initiative. The following issues were highlighted:

- The RAM-SHIPNET definitions have yet to be properly represented in AP226. RAM-SHIPNET will support the activities of RAM EWG in this area.
- The equipment boundary as defined by ISO 14224 does not satisfy the RAM/SHIPNET requirements. The decision reached on the way AP226 will support the exchange of boundary definition (see Section 12) will be considered as a long term solution. RAM-SHIPNET will take part in the testing of the concept.

An electronic copy of RAM-SHIPNET presentation is available and will be sent to participants upon request.

9. Presentation on EDIMAR project

Mr Stephan Wurst (BIBA) made a presentation on the EDIMAR (Electronic Data Interchange in European MARitime Industry) project. The EDIMAR progress since last meeting includes:

- AP226 further developed;
- ARM development using EXPRESS language continued;
- Development of an EXPRESS model for the EDIMAR exchange scenario;
- Generation and population of STEP Physical File;
- Development of STEP translators progressed.

EDIMAR project will end in March 1999 and a full data exchange implementation is expected by the end of the project. The presentation was followed by some discussion on practical issues relating to data exchange.

10. Presentation on AP226 Class Library

A document entitled “AP226 Product Class Library: Development guidelines and selected classes” was handed out to the participants. Dr Bazari introduced this document and presented introductory material on related standards and activities including process industry STEPlib, Oil and Gas standard 15926 and Part Library Standard ISO 13584.

The meeting agreed that the development of AP226 Class Library should be based on existing data definitions. Actions will be taken to identify such standards and see if they can be represented in Class Library format. The meeting also agreed that a proper organisation for such development is needed to be identified.

EWG agreed once again that development of AP226 class library should continue in parallel to AP226 standard development and should be regarded as a long term activity of AP226 EWG.

11. Presentation on MOSys Project

Dr Bazari presented an overview of MOSys project and its progress. MOSys will contribute to AP226 development up to the end of year 2000 and will take it through the standardisation process. MOSys will mainly deal with ship machinery operational and RAM data. Dr Bazari reported that RAM and maintenance models in the current version of AP226 have been developed further using MOSys resources. The definition of three exchange scenarios is in progress and a data repository development based on AP226 has been initiated.

12. Exchange of Information on Equipment Boundary

The result of action item Mtg5.5 on “equipment boundary” further discussed. The following AP226 solution was presented by Dr Bazari:

- AP226 will facilitate the exchange of data on “product composition” and “product connections”;
- The above will implicitly define the boundary of the equipment (i.e. the components that are part of the equipment);
- AP226 will not explicitly associate to each “equipment” a fixed set of “product composition”, “product connection” and so on.

The meeting agreed that the above approach is reasonable. However, it was proposed that the idea should be tested in a real case in order to show its applicability.

13. Complexity of STEP Documentation

The action item Mtg5.6 on the subject was further discussed. The letter by GL to DIN (Germany Standardisation Organisation), that proposes the use of class library as a possible way forward to reduce the complexity of STEP documents, was presented.

EWG agreed that the Product Class Library needs to be used for data definition while STEP document will mainly concentrate on representation of such data in a data model. This will ensure that domain experts do not end up dealing with

documents that cannot be easily understood. In addition the industry requirements will be defined in a more consistent way by domain experts through participation in Product Class Library development.

14. Presentation on INKOFS Project

RU (Mr Gau) presented an overview of the INKOFS (Information Management for Distributed Design and Construction in Ship Production). This is a new German project funded from October 1998 to August 2000. This project will use either AP226 or AP217 for exchange of data on equipment modules in a shipbuilding environment.

15. Other Items

The following is the list of other important items discussed or agreed in the meeting:

- The new list of AP226 business exchange scenarios is given in Appendix I (result of action item EWG 5.11)
- Mr Mechsner has proposed the text in Annex II for the “new Building Machinery Database (result of action item EWG2.14).
- The EWG agreed that e-mail will be their main communication medium. The meeting advised the AP226 team to send all the communications via e-mail where possible.
- A new AP226 Working Draft, inclusive of recent changes, to be prepared. This new working draft will be used to initiate the next phase of standardisation process commonly known as Interpretation. The new working draft will be referred to as “Interpretation Working Draft”.

16. Outline List of Actions

The following list of actions was agreed.

Code	Description	Action
EWG3.21	Consider implications for breakdown structures occasioned by Diesel-electric equipment such as ‘static converters’.	MoD
EWG4.20	A propulsor EWG workshop (1-day) to be organised to sort out the following issues: <ul style="list-style-type: none"> - Definition of terms. - Propulsor class library and extension of classes. - Propeller material. - AP216/AP226 harmonisation. 	LR
EWG4.23	EWGs agreed that product specification can be a good exchange scenario. AP226 Team to investigate how this scenario could be defined for different types of equipment.	LR
EWG4.24	The question of modelling “Condition Monitoring” and “Operation” was raised against the Task Model. AP226 to investigate how such aspects of AP226 will be developed.	LR

EWG6.1	Progress on EDIMAR project to be reported at the next workshop.	BIBA
EWG6.2	Progress on MOSys project to be reported at the next workshop.	LR
EWG6.3	Progress on RAM/SHIPNET projects to be reported at the next workshop.	UNO
EWG6.4	Progress on Agder project to be reported at the next workshop.	DNV
EWG6.5	Progress on NOR-RAM to be reported at the next workshop.	MT
EWG6.6	Progress on Rostock project to be reported at the next workshop.	RU/GL
EWG 6.7	Circulate the electronic version of RAM/SHIPNET, NOR-RAM and Rostock presentations to EWG members upon request.	LR
EWG 6.8	A proper home for “AP226 Product Class Library” to be found. Other standardisation bodies to be investigated for this purpose.	LR/GL
EWG 6.9	A new name to be proposed for “AP226 Class Library”.	LR
EWG 6.10	The new name for “AP226 Class Library” to be agreed using EWG e-mail group list.	All
EWG 6.11	The proposed representation of “equipment boundary” to be tested to show if it satisfies the industry requirements.	UNO/DNV /ST
EWG 6.12	The Interpretation Working Draft to be prepared for discussion in the next meeting.	LR
EWG 6.13	The scope of AP226 and AP217 to be investigated by Rostok to see which AP is going to be used for the INKOFs project.	RU
EWG 6.14	Standards in support of developing AP226 Class Library to be identified and members of EWGs are given tasks in this area.	LR
EWG 6.15	In resolving the issues on RAM, BS 3811: 1984 to be consulted for definitions.	RAM EWG
EWG 6.16	Sealink comprehensive list of attributes to be consulted for developing AP226 Class Library.	LR/BV
EWG 6.17	RAM exchange scenario to be defined and agreed by next meeting.	MT/UNO
EWG 6.18	Present RAM exchange scenario at the next meeting.	LR
EWG 6.19	Add logistic delay to the maintenance data model.	LR
EWG 6.20	Complete the AP226 Class Library for the selected items distributed in the meeting.	All
EWG 6.21	Prepare a summary report on the AP226 support projects.	LR
EWG 6.22	Progress of other ship APs to be reported in the next meeting.	LR
EWG 6.23	A list of terms, currently defined in AP226, that may be considered as “Common Knowledge Term” to be compiled and agreed over the e-mail.	LR/All
EWG 6.24	The fault and failure definitions and their relating terminology to be agreed.	RAM EWG

EWG 6.25	Carry out the investigation entitled “collaborative use of AP226 and Parts Library standards for exchange of ship mechanical system data”.	CTC/LR
EWG 6.26	Report on result of action item Mtg6.25 in the next meeting.	CTC/LR
EWG 6.27	Finalise the Industry Review Report III and circulate.	LR
EWG 6.28	MMA (US Marine Machinery Association) to be contacted for possible participation in developing AP226 Class Library.	UNO
EWG 6.29	Identification of standards for AP226 Class Library to be carried out systematically by identifying the standard and organisation responsible for its review and input to AP226 Class Library.	All

16. Date and Place of Next Meeting

Next meeting is scheduled for **16 and 17 September 1999** and will take place at Lloyd’s Register, Croydon, UK.

Annex I - AP226 Business Exchange Scenario

For each system, equipment and component, the following may apply:

BES No.	Title of Business Exchange Scenario	Supported Lifecycle Phase/ Business Activity	Supported Application Software	Supported exchanges	Relevant AP226 Conformance Class
BES1	Exchange of 3-D outline geometry.	Shipbuilding/Ship Classification	CAD Systems, PDMS	SU-SY	CC1
BES 2	Exchange of CAD drawings	All lifecycle phases	CAD Systems, PDMS	SU-SY	CC1
BES 3	Exchange of connectivity information	Shipbuilding	CAD Systems, PDMS	SU-SY	CC1
BES4	Exchange of operational data including performance data	Ship Operation	FMS, MMS, EAS, PDMS	Ship-Shore SU-SO	CC4
BES5	Exchange of design data (functional)	Shipbuilding/Ship Operation	CAD Systems; MMS, EAS, PDMS	SU-SY SY-SO	CC3
BES6	Exchange of equipment specification and general characteristics	Shipbuilding	CAD Systems; PDMS	SU-SY	CC2
BES7	Exchange of RAM data including failures.	Shipbuilding and Ship Operation	RAM Databases; MMS; EAS, PDMS	SO-CS SO-SU	CC6
BES8	Exchange of maintenance data including maintenance requirement	Ship Operation	FMS, MMS, Shipbuilding Systems, PDMS	SO-SY SO-SU	CC5
BES9	Exchange of survey/inspection data	Ship Operation	FMS, MMS, CSS, PDMS	SO-CS	CC5
BES10	Exchange of lifecycle support data including spares part, cost data and so on.	Ship Operation	FMS, MMS, PDMS	SO-SU	CC5
BES11	Exchange of product structure (and bill of material) information	Shipbuilding	CAD Systems, PDMS	SU-SY	CC1
BES12	Exchange of engineering analysis data in area of: Performance analysis; Condition monitoring; Noise and Vibration; Finite Element Analysis; And so on.	All lifecycle phases	MMS, specialised EAS, PDMS	SY-CS SO-CS SU-SY	CC6

CAD: Computer Aided Design
 CC: Conformance Class
 CS: Classification Society
 CSS: Classification Survey Systems
 EAS: Engineering Analysis Systems (quite a diverse number of applications)
 FMS: Fleet Management Systems
 MMS: Maintenance Management System
 PDMS: Product Data Management System
 SO: Ship Owner/Operator
 SU: Supplier
 SY: Ship Yard

Annex II – Introduction to New Building Machinery Database Exchange Scenario

Modern ships are complex technical assets, which consists of several thousand types of equipment. A major task in building a ship is to purchase this different equipment and to integrate them into the design of the ship. For this task the shipyard needs a lot of data about the equipment like design data, performance data, installation data etc. Additional information about the operation of the equipment including description of maintenance work, spare parts delivered on board and available spare parts, which could be ordered on demand, are required, which will be handed over to the owner for the operational phase of the ship.

Today this information is delivered in nearly all cases only in paper form. The owners on the other hand demand in most cases an electronic data base about operational data for the logistic support like spare parts lists etc. As today there is no standard for this kind of database, this means, that the information has to be keyed in manually into the database of the owner. The lack of a common standard hinders the supplier, to deliver their information in an electronic form.

The consequence is that many ship yards refuse to deliver information about the equipment and its spare parts in digital format, as the work involved with this task is significant and the costs could not be recovered from the owner.

The shipyard is just a collector of this information and will only pass them over to the owner. The supplier of the equipment is responsible for correctness and completeness of the information.

A common standard for the information and the exchange of data would facilitate the transfer of necessary data from supplier to the yard in an electronic format. This could be performed by either Internet technology (e-mail, ftp, EDIFACT) or by exchange via floppy disc, CD ROM etc. The yard would assemble these information in a common ship database by direct electronic integration without the need to manually key in and reformat this data. An additional benefit for the shipyard includes the automatic capturing of information for internal use like weight data, sensor data etc.

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